We claim:

1. A genetic immunization method for inducing an antigen-specific immune response, comprising: a nucleic acid sequence encoding a peptide containing at least one antigenic determinant, operatively linked to one or more control sequences such that the nucleic acid sequence is expressed in a host cell, wherein the nucleic acid sequence is optionally formulated into a particle by complexation with one or more polymers, and wherein the nucleic acid is delivered to a vertebrate host cell.

2. The method of claim 1, wherein the host cell is a lymphoid cell.

3. The method of claim 2, wherein the host cell is a gut-associated lymphoid cell.

4. The method of claim 2, wherein the host cell is a nasal lymphoid cell.

5. The method of claim 1, wherein the delivery step is through intravascular administration.

6. The method of claim 1, wherein the delivery step is through oral administration.

7. The method of claim 1, wherein the nucleic acid is further protected by a coating.

8. The method of claim 7, wherein the coating is an enteric coating.

9. The method of claim 8, wherein the coated nucleic acid is orally delivered.

10. The method of claim 1, wherein the sequence is a DNA sequence.

11. The method of claim 10, wherein the DNA sequence is a plasmid.

12. The method of claim 1, wherein the host is a mammal.

13. A genetic immunization composition formulated for inducing an antigen-specific immune response, comprising: a nucleic acid sequence encoding a peptide containing at least one antigenic determinant, operatively linked to one or more control sequences such that the nucleic acid sequence is expressible in a host cell, wherein the nucleic acid sequence is optionally formulated into a particle by complexation with a polymer, for delivery to a vertebrate host cell.

14. The composition of claim 13, wherein the host cell is a lymphoid cell.

15. The composition of claim 14, wherein the host cell is a gut-associated lymphoid cell.

16. The composition of claim 14, wherein the host cell is a nasal lymphoid cell.

17. The composition of claim 13, wherein the delivery step is through intravascular administration.

18. The composition of claim 13, wherein the delivery step is through oral administration.

19. The composition of claim 13, wherein the nucleic acid is further protected by a coating.

20. The composition of claim19, wherein the coating is an enteric coating.

21. The composition of claim 20, wherein the coated nucleic acid is orally delivered.

22. The composition of claim 13, wherein the sequence is a DNA sequence.

23. The composition of claim 22, wherein the DNA sequence is a plasmid.

24. The composition of claim 13, wherein the host is a mammal.

25. A method for generating an antibody response in a vertebrate host comprising of administering a nucleic acid encoding an antigen, the nucleic acid optionally being complexed to a polymer, in an amount sufficient to induce the desired immune response directed against the expressed antigen.

26. A method for generating a cellular immune response in a vertebrate host comprising of administering a nucleic acid encoding an antigen, the nucleic acid optionally being complexed to a polymer, in an amount sufficient to induce the desired immune response directed against the expressed antigen.

27. A method for generating an immune response in a vertebrate host, comprising: administering a nucleic acid encoding an antigen, the nucleic acid optionally being complexed to a polymer, in an amount sufficient to induce the desired immune response directed against the expressed antigen, and the nucleic acid is delivered to the intestinal lumen.

28. A method for determining the presence of a genetic immune response in a vertebrate, wherein the antigen is produced in a second vertebrate following nucleic acid delivery.

29. A method for determining the presence of a genetic immune response in a vertebrate, wherein the antigen is produced in a cell line following nucleic acid delivery.

30. A method for determining the presence of a genetic immune response in a vertebrate, wherein the antigen is produced in a primary cell culture following nucleic acid delivery.

31. A kit for genetic immunization, the kit comprising a transfection complex for *in vivo* gene transfer.

32. A kit for the detection of a genetic immune response, the kit comprising a transfection complex for *in vitro* gene transfer.

33. A kit for genetic immunization and detection of a genetic immune response, the kit comprising transfection complexes for *in vivo* and *in vitro* gene transfer.